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Review of taxonomic status of *Polypedilum quinquesetosum* (Edwards, 1931) (Diptera, Chironomidae)

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Estatus taxonómico de *Polypedilum quinquesetosum* (Edwards, 1931) (Diptera, Chironomidae)

RESUMEN. El estado taxonómico de *Polypedilum quinquesetosum* (Edwards) es revisado sobre la base del estudio del holotipo macho de la especie y de nuevos hallazgos. Tras el análisis de caracteres, esta especie pertenece al subgénero *Tripodura* Townes y se establece la nueva combinación. Se expande la diagnosis de la especie, se discute las relaciones con el resto de las especies Neotropicales del subgénero y se extiende su distribución geográfica.

PALABRAS CLAVE. *Polypedilum.* Chironominae. Sistemática. Somuncurá. Neotrópico.

ABSTRACT. The taxonomic status of *Polypedilum quinquesetosum* (Edwards) is reviewed upon the study of the male holotype of the species and new findings. After the character analysis, this species belongs to the subgenus *Tripodura* Townes and the new combination is established. The species diagnosis is expanded, the relationships with the rest of the Neotropical species of the subgenus are discussed and its geographical distribution is extended.

KEY WORDS. *Polypedilum.* Chironominae. Systematics. Somuncurá. Neotropics.

INTRODUCTION

The genus *Polypedilum* Kieffer (Chironominae, Chironomini) is a cosmopolitan genus, occurring in all zoogeographical regions except Antarctica. *Polypedilum* is a very species-rich genus of chironomids and the larvae occur in all standing and flowing waters, except at high altitude and latitude (Vårdal *et al.*, 2002). The genus is quite well known in the Neotropics (Spies & Reiss, 1996) with more than 65 described species.

The genus *Polypedilum* has been divided into five subgenera: *Cerobregma* Sæther & Sundal; *Pentapedilum* Kieffer; *Polypedilum s. str.*, with two species groups, the *nubeculosum* and the *nubifer* groups; *Tripodura* Townes; and *Uresipedilum* Sasa & Kikuchi (Sæther & Sundal, 1999). The genus *Asheum* Sublette & Sublette (Sublette & Sublette, 1983) was previously placed in *Polypedilum*, but as the pulvilli are not bilobed and the eighth abdominal segment of the male is not basally constricted it was reestablished as a separate genus by Oyewo & Sæther (2008). Sæther *et al.* (2010) reestablished *Tripedilum* Kieffer and *Kribionympha* Kieffer genera as subgenera of *Polypedilum* and erected the subgenus *Probolum* Andersen *&* Sæther.

Edwards (1931) described the species *Chironomus (Polypedilum) quinquesetosus* that was later transferred to the genus *Polypedilum* by Spies & Reiss (1996). This species is only known by its type material from Peulla and Ensenada in Chile and Correntoso Lake in Argentina. The finding of male imagos of *Polypedilum quinquesetosum* collected during several field trips allows the review of its taxonomic status

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and the proposal of a new combination, the expansion of its diagnosis and the extension of its geographical distribution.

MATERIALS AND METHODS

The specimens were mounted in Canada balsam following the procedures described by Paggi (2009) and were compared with the holotype deposited in the Natural History Museum (London, UK (NHM)). The holotype of *Polypedilum quinquesetosum* is pinned and the hypopygium is mounted in Canada balsam, for this reason its measurements were not included in the diagnosis presented in this study. Measurements are in µm except when otherwise stated. The terminology and abbreviations for general morphology follow Sæther (1980). The new material of *Polypedilum quinquesetosum* is deposited in the Museo de La Plata, Buenos Aires (MLP).

TAXONOMY

The species *P. quinquesetosum* belongs to the subgenus *Tripodura* for its club-shaped superior volsella without an apical projection, a broad anal point, superior volsella covered with microtrichia and with setae on distal parts of the outer and inner margin, but the wings lack dark markings and the wing membrane lacks setae. The new combination *Polypedilum (Tripodura) quinquesetosum* com. nov. is established.

Polypedilum (Tripodura) quinquesetosum* (Edwards, 1931) *com. nov.

Chironomus (Polypedilum) quinquesetosus Edwards, 1931: 315.

Polypedilum quinquesetosum, Spies & Reiss, 1996: 72.

Polypedilum (Tripodura) quinquesetosum, new combination.

Material examined. CHILE: Llanquihue province, Peulla, 12/13-XII-1926, F. & M. Edwards, B.M. 1927-63, holotype male (NHM).

ARGENTINA. Neuquén: P. N. Nahuel Huapi, Lago Traful, Villa Traful, 40° 30' 16.5'' S, 71° 34' 57.2'' W, 11-II-2002, sweep net, Donato col, 1 male (MLP); **Río Negro**: P. N. Nahuel Huapi, A° Challhuaco, 41° 13' 32.9'' S, 71° 17' 49.8'' W, 1045 m, 28-II-2007, drift net, Garré and Montes de Oca col., 1 male (MLP); P. N. Nahuel Huapi, A° Blest, 41° 01' 24.8'' S, 71° 49' 21'' W, 790 m, 3-III-2007, CDC, Garré and Montes de Oca col., 2 males (MLP); P. N. Nahuel Huapi, Laguna Los Juncos, 41° 03' 37.9'' S, 71° 00' 34.3'' W, 906 m, 12-XII-2006, sweep net, Garré and Montes de Oca col., 3 males (MLP); P. N. Nahuel Huapi, Puerto Blest, 20-II-2008, at light, Donato col., 1 male (MLP); Vertiente y chorrillo, Estancia Jaguar Musso, Paraje Chasicó, 41° 08' 28'' S - 67° 35' 43.9'' W, 961 m, 6/7-XI-2006, sweep net, Donato col., 2 males (MLP).

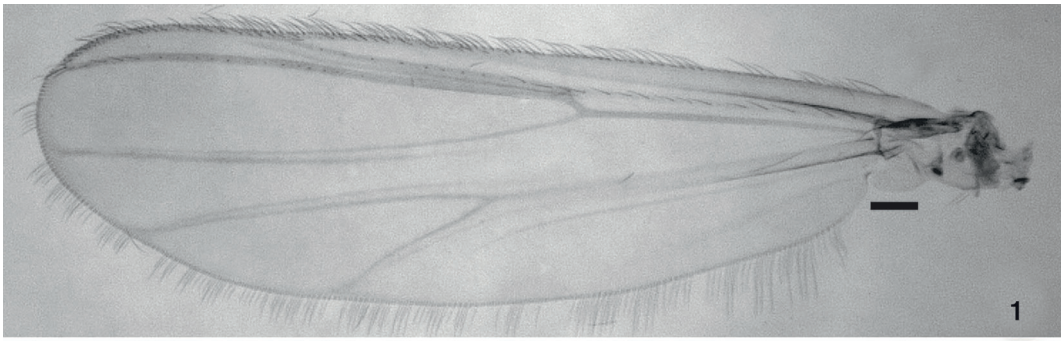
Male (n = 10). Total length 3.38–4.98 mm. Wing length 1.72–2.19 mm. Wing length / length of profemur 1.89–2.37. Color blackish with pale legs and halteres, as in the original description.

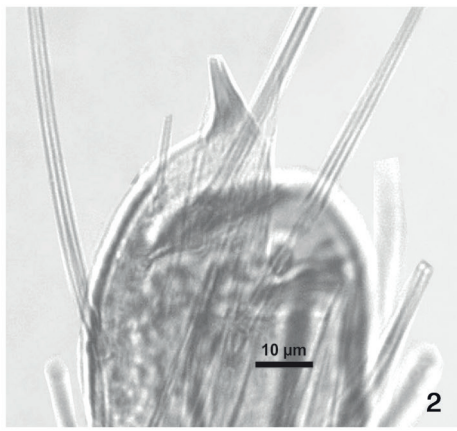
Head. AR 0.85–1.14 (5). Ultimate flagellomere 379–568 long (7). Temporal setae 8–10 (5) composed of 3 inner verticals, 5–7 outer verticals. Clypeus with 10–18 (5) setae. Tentorium 112–158 long, 30–40 (5) wide; stipes 108–162 long (6), 6–10 wide (6). Palp segment lengths (6): 28–46, 38–56, 88–126, 86–142, 134– 218. Apex of third palpomere with 2–5 sensilla, longest 16 µm long. Thorax. Acrostichals 8–13 (9), biserial; dorsocentrals 9–19 (8); prealars 2–6; supralars 0–1. Scutellum with 4–19 setae, irregularly biserial.

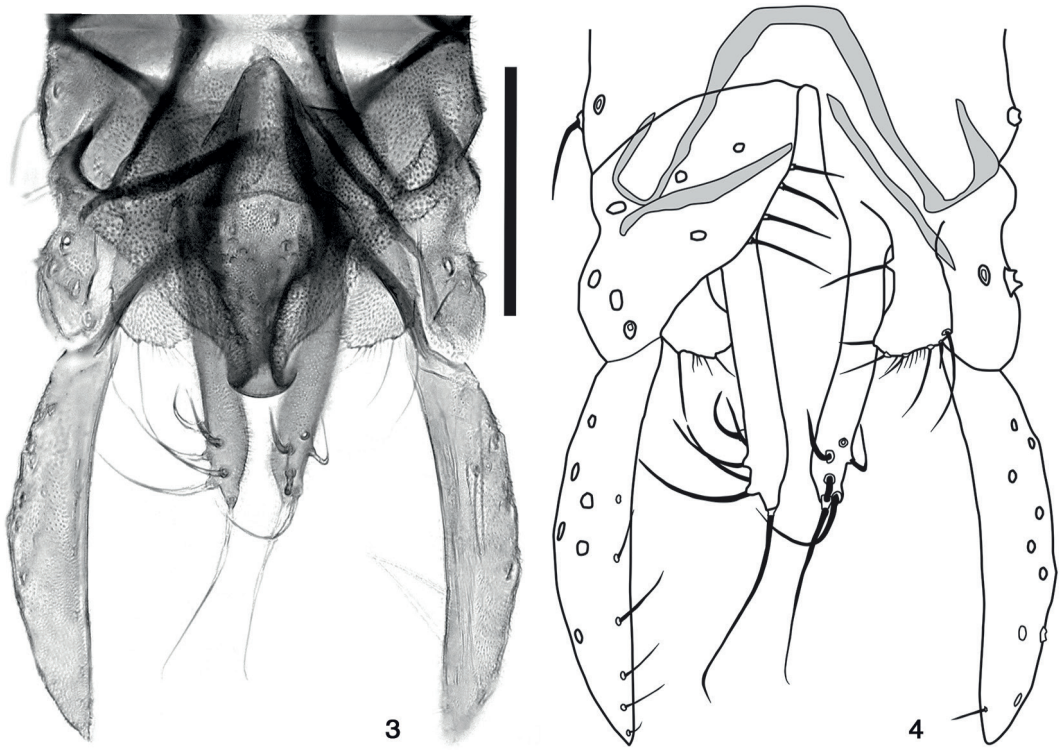
Wing (Fig. 1). VR 1.38–1.8. Brachiolum with 1–3 setae (7), R with 12–23, R_1 with 11–15 (5), R_{4+5} with 19–32 (5) setae. Squama with 3–11 setae (6).

Legs. Scale of fore tibia 30–42 (9) long (Fig. 2). Apex of fore tibia 44–62 (9) wide, of mid tibia 44–62 (9) wide, of hind tibia 50–70 (9) wide. Length and proportions of legs as in Table I.

Hypopygium (Figs 3–4). Anal point 56–74 (6) long, 42–84 (6) wide at base, 20–28 (6) wide at apex. Tergite IX with 9–23 setae medially (6) and 14–18 setae at base of anal point (6). Phallapodeme 58–112 (9) long; transverse sternapodeme 34–62 (9) long. Gonocoxite 110–172 (9) long. Superior volsella club-shaped, with one inner seta, 3 apical setae and 3 lateral setae, 21–56 (8) long, 10–20 (8) wide at base, 22–32 (8) wide at apex. Inferior volsella digitiform 74–118 long, 14–26 wide at base, 13–26 wide at apex, with 4–10 split setae subapically and one stout seta at apex. Gonostylus 144–172 (9) long. HV 2.21–2.89 (9). HR 0.68–1.05 (9).







Figs. 1 - 4. *Polypedilum (Tripodura) quinquesetosum* (Edwards). Male imago. 1, wing; 2, tibial scale of fore leg; 3, hypopygium, dorsal view; 4, hypopygium with tergite IX removed, right, dorsal view, left, ventral view. Scale bar= 100 µm, except in Fig. 2.

Table I. Lengths (in µm) and proportions of legs of *Polypedilum (Tripodura) quinquesetosm* (Edwards) (male) (*n* = 6). Abbreviations: Femur (fe); Tibia (ti); Tarsomeres 1-5 (ta_{1-5}); Leg Ratio (LR), ratio of metatarsus to tibia; beinverhältnisse» (BV), combined length of femur, tibia, and basitarsus divided by combined length of tarsomeres 2-5; «Schenkel-Scheine-verhältnis» (SV), ratio of femur plus tibia to metatarsus.

	fe	ti	ta_1	ta_2	ta_3
P_1	1600-1880	1100-1460	1920-2140	1120-1300	850-960
P_2	1800-2040	1700-2060	900-1400	520-760	380-540
P_3	1840-2220	1730-2220	880-1540	720-880	390-740
	ta_4	ta_5	LR	BV	SV
P_1	560-620	300-360	1.45-1.74	1.59-1.80	1.40-1.58
P_2	260-340	200-300	0.53-0.68	2.71-3.24	2.91-3.92
P_3	240-440	240-360	0.51-0.70	2.43-2.98	2.73-4.06

DISCUSSION

Systematics

Most of the *Polypedilum* species described from the Neotropics were established by Bidawid & Fittkau (1995) and Bidawid-Kafka (1996). These authors proposed a codification for several taxonomically informative characters that is adopted in this study; particularly, the anal tergal band (= *Tergitebänder* of Bidawid & Fittkau, 1995), base of anal point (= *Typen des Ventrallobus* of Bidawid & Fittkau, 1995) and type of superior volsella (= *Typen von Anhang I* of Bidawid & Fittkau, 1995).

The representatives of the subgenus *Tripodura* of the Neotropics could be divided into those that possess wing markings and those without this character state. In the latter group, *P. (T.) quinquesetosum* falls together with nine other species (Table II), of which three share two of the three characters analyzed. The species *P. (T.) carijona* Bidawid & Fittkau shares with *P. (T.) quinquesetosum* the anal tergal bands and inferior volsella type A, but a more detailed analysis of the volsella shows that the superior volsella of the former species is parallel-sided with rounded apex and with two inner setae. Besides these characters, differences exist also in the shape of the base of anal point, shape and number of setae of the inferior volsella, gonostylus, AR and LR. The species *P. (T.) karyana* Bidawid & Fittkau shares with *P. (T.) quinquesetosum* the shape of the base of anal point and inferior volsella type A, but a more detailed analysis of this last structure shows that the former species has one straight and short inner seta, three slightly curved apical setae and two long lateral setae. This species has a lower AR (0.22) than that of *P. (T.) quinquesetosum*. From the species described by Roback & Coffman (1983) only two characters were taken into account since the anal tergal bands were not included by these authors. The species *P. titicacae* Roback & Coffman and *P. umayo* Roback & Coffman share with *P. (T.) quinquesetosus* the type or superior volsella but both have a different shape of the base of anal point. Besides, the shape of the superior volsella is different from that of *P. (T.) quinquesetosus* since it possesses a projection directed medially, with one long lateral seta and several short apical setae. *Polypedilum (T.) villcanota* shares with *P. (T.) quinquesetosus* the character shape of base of anal point but the shape of the superior volsella type C of the former species differentiates both species.

Geographic distribution

The type localities of *Polypedilum (T.) quinquesetosum* have in common that they are located near lakes. The type locality of the holotype is near Lago Todos los Santos and the locality of the paratype is near Lago Llanquihue, both in the Valdivian district in Chile. The locality of the female paratype, although not included in this study, is Lago Correntoso in Argentina and is placed in the Deciduous district of the Subantarctic province (e.g. Cabrera & Willink, 1973).

Table II. Known species of *Polypedilum (Tripodura)* from the Neotropics with unmarked wings and bare membrane. Character codification follows Bidawid & Fittkau (1995).

Species	Anal tergal band	Base of anal point	Type of superior volsella
P. (T.) atroari Bidawid-Kafka	C_2	B	F_1
P. (T.) carijona Bidawid & Fittkau	A	A	A
P. (T.) ge Bidawid & Fittkau	C_2	C	A
P. (T.) kajapo Bidawid & Fittkau	D	C	A
P. (T.) karyana Bidawid & Fittkau	B_1	E	A
P. (T.) kuikuro Bidawid & Fittkau	C_2	C	A
P. (T.) quinquesetosum (Edwards)	A	E	A
P. (T.) titicacae Roback & Coffman	Not observed	A	A
P. (T.) umayo Roback & Coffman	Not observed	A	A
P. (T.) villcanota Roback & Coffman	Not observed	E	C

Polypedilum (T.) quinquesetosum shows a transAndean distribution. This pattern is shared with several chironomid genera and species (Donato *et al.*, 2009) [e. g. some *Barbadocladius* (Cranston & Krosch, 2011), *Stictocladius* (Sæther & Cranston, 2012)], suggesting that the Andes (at least at the lower elevation in this region) is not a barrier to dispersal.

The new records of *P. (T.) quinquesetosum* extend its distribution eastwards into Argentina. The Los Juncos lagoon is located in the Patagonian steppe and it is not permanent. One year after 2006 collecting, this lagoon was dry. The other locality is in the Somuncura Plateau, located in northeast Patagonia between 41°- 45° S and 66°- 68° W. This plateau has a total surface of approximately 30000 Km^2, a maximum altitude of 1970 m a.s.l. and a volcanic origin (around 25 Ma.). The aquatic environments at the plateau are represented by streams, springs and lagoons. These bodies of water derive most of their water from precipitation in the form of rain, except Valcheta stream which has a thermal origin. The specimen of *P. (T.) quinquesetosum* was collected beside a small spring, and taking into account the rest of its records, the preference of this species to lentic environments is suggested.

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